Mobile phase: MeOH:buffer 85:15 (Buffer was 90.7 mL 66.7 mM Na_2HPO_4 and 9.3 mL 66.7 mM KH_2PO_4 made up to 1 L with water, pH 7.6.)
Flow rate: 5 (sic)
Injection volume: 20
Detector: UV (wavelength not given)

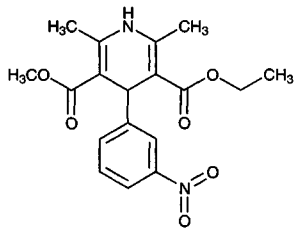
CHROMATOGRAM
Retention time: 4.32
Limit of detection: 100 nM

OTHER SUBSTANCES
Simultaneous: chlordiazepoxide, diazepam, flurazepam

KEY WORDS
comparison with capillary electrophoresis; capillary GC; and polarography

REFERENCE
McGrath,G.; McClean,S.; O'Kane,E.; Smyth,W.F.; Tagliaro,F. Study of the capillary zone electrophoretic behaviour of selected drugs, and its comparison with other analytical techniques for their formulation assay, *J.Chromatogr.A*, **1996**, *735*, 237–247.

Nitrendipine



Molecular formula: $C_{18}H_{20}N_2O_6$
Molecular weight: 360.37
CAS Registry No.: 39562-70-4
Merck Index: 6669

SAMPLE
Matrix: blood
Sample preparation: 2 mL Serum + 2 mL 20 ng/mL nimodipine in water, mix, add 1 mL 1 M NaOH, add 12 mL hexane:ethyl ether 50:50, extract, centrifuge at 300 g for 10 min. Remove the organic layer and evaporate it to dryness under a stream of nitrogen, reconstitute the residue in 250 μL mobile phase, add 250 μL water, inject a 50 μL aliquot.

HPLC VARIABLES
Column: 150 × 4.6 3 μm Spherisorb ODS
Mobile phase: MeOH:THF:water 47:15:38
Flow rate: 0.5
Injection volume: 50
Detector: UV 238

CHROMATOGRAM
Retention time: 11.87
Internal standard: nimodipine (13.08)
Limit of detection: 1 ng/mL

OTHER SUBSTANCES
Extracted: metabolites

KEY WORDS
serum

REFERENCE
Janis,R.A.; Krol,G.J.; Noe,A.J.; Pan,M. Radioreceptor and high-performance liquid chromatographic assays for the calcium channel antagonist nitrendipine in serum, *J.Clin.Pharmacol.*, **1983**, *23*, 266–273.

SAMPLE
Matrix: blood
Sample preparation: 100 μL Plasma + 1 mL ethyl acetate, shake horizontally for 3 min, centrifuge at 10000 g for 10 min. Remove the organic layer and evaporate it to dryness under a stream of nitrogen at 40-50°, reconstitute the residue in 200 μL mobile phase, inject a 100 μL aliquot.

HPLC VARIABLES
Guard column: 20 × 2 30-40 μm Perisorb RP-18 (Upchurch)
Column: 150 × 4.6 5 μm Hypersil ODS
Mobile phase: MeOH:water 65:35
Flow rate: 1
Injection volume: 100
Detector: UV 238

CHROMATOGRAM
Retention time: 7.5
Internal standard: nitrendipine

OTHER SUBSTANCES
Extracted: nimodipine

KEY WORDS
monkey; plasma; protect from light; nitrendipine is IS

REFERENCE
Qian,M.; Gallo,J.M. High-performance liquid chromatographic determination of the calcium channel blocker nimodipine in monkey plasma, *J.Chromatogr.*, **1992**, *578*, 316–320.

SAMPLE
Matrix: blood
Sample preparation: 2 mL Whole blood or plasma + 2 mL buffer + 5 mL chloroform:isopropanol: n-heptane 60:14:26, shake gently horizontally for 10 min, centrifuge at 2800 g for 10 min. Remove the lower organic layer and evaporate it to dryness under vacuum at 45°, reconstitute the residue in 100 μL mobile phase, centrifuge at 2800 g for 5 min, inject a 50 μL aliquot of the supernatant. (Buffer was saturated ammonium chloride solution 25% diluted with water, adjusted to pH 9.5 with 25% ammonia solution.)

HPLC VARIABLES
Column: 300 × 3.9 4 μm NovaPack C18
Mobile phase: MeOH:THF:buffer 65:5:30 (Buffer was 0.68 g/L (10 mM (sic)) KH_2PO_4 adjusted to pH 2.6 with concentrated orthophosphoric acid.) (At the end of each session wash the column with water for 1 h and MeOH for 1 h, re-equilibrate for 30 min.)
Column temperature: 30
Flow rate: 0.8
Injection volume: 50
Detector: UV 236

CHROMATOGRAM
Retention time: 6.00
Limit of detection: <120 ng/mL

KEY WORDS
whole blood; plasma; interferences may occur–compounds (all of which are extracted) elute in this order tenoxicam; iproniazid; methocarbamol; methotrexate; caffeine; nialamide; colchicine; cytarabine; benzoylecgonine; acetaminophen; diazoxide; dacarbazine; sulfinpyrazole; flumazenil; sulpride; morphine; atenolol; toloxatone; terbutaline; albuterol; phenobarbital; ranitidine; tiapride; phenol; chlormezanone; aspirin; metformin; ritodrine; codeine; sultopride; amisulpride; naltrexone; lisinopril; benzocaine; nizatidine; nalorphine; mephenesin; naloxone; sotalol; carteolol; procainamide; carbamazepine; bromazepam; nalbuphine; nadolol; procarbazine; dihydralazine; omeprazole; strychnine; acebutolol; glutethimide; chlorpropamide; glipizide; triazo-

lam; prazosin; flunitrazepam; clonazepam; metoclopramide; melphalan; estazolam; tolbutamide; ephedrine; clonidine; pindolol; clobazam; minoxidil; disopyramide; nitrazepam; dextromethorphan; tofisopam; zopiclone; debrisoquine; sulindac; alprazolam; cycloguanil; lorazepam; methaqualone; ketamine; piroxicam; metoprolol; nifedipine; quinine; mephentermine; prilocaine; pentazocine; oxazepam; tiaprofenic acid; quinidine; celiprolol; ajmaline; yohimbine; lidocaine; secobarbital; viloxazine; mepivacaine; meperidine; doxylamine; labetalol; temazepam; amodiaquine; benperidol; droperidol; hydroxychloroquine; zolpidem; ketoprofen; alminoprofen; cicletanine; moclobemide; chloroquine; cocaine; timolol; nomifensine; ticlopidine; acenocoumarol; vindesine; mexiletine; dipyridamole; trazodone; pipamperone; pyrimethamine; benazepril; vincristine; metapramine; chlordiazepoxide; oxprenolol; warfarin; clorazepate; flecainide; phencyclidine; thiopental; fenfluramine; metipranolol; triprolidine; naproxen; buprenorphine; verapamil; buspirone; tianeptine; midazolam; bupivacaine; carbinoxamine; loprazolam; cetirizine; chlorpheniramine; moperone; cibenzoline; medifoxamine; astemizole; vinblastine; nicardipine; bisoprolol; diltiazem; glibornuride; reserpine; aconitine; nitrendipine; diazepam; mianserin; ramipril; haloperidol; tetracaine; alprenolol; acepromethazine; glibenclamide; chlorophenacinone; doxepin; nimodipine; diphenhydramine; cyclizine; histapyrrodine; phenylbutazone; demexiptiline; clozapine; proguanil; trifluperidol; medazepam; cyamemazine; bumadizone; suriclone; propranolol; acepromazine; dothiepin; dextromoramide; fenoprofen; dextropropoxyphene; loxapine; betaxolol; propafenone; promethazine; thioproperazine; methadone; amoxapine; quinupramine; opipramol; cyproheptadine; brompheniramine; mefenidramine; protriptyline; flurbiprofen; tetrazepam; zorubicin; prazepam; alimemazine; loperamide; imipramine; desipramine; levomepromazine; hydroxyzine; niflumic acid; penbutolol; fluvoxamine; pimozide; daunorubicin; indomethacin; maprotiline; tropatenine; etodolac; fluoxetine; amitriptyline; nortriptyline; tioclomarol; diclofenac; mefloquine; trimipramine; chlorambucil; lidoflazine; ibuprofen; floctafenine; alpidem; loratadine; chlorpromazine; clomipramine; carpipramine; thioridazine; fentiazac; clemastine; mefenamic acid; fluphenazine; prochlorperazine; penfluridol; bepridil; terfenadine; trifluoperazine

REFERENCE

Tracqui,A.; Kintz,P.; Mangin,P. Systematic toxicological analysis using HPLC/DAD, *J.Forensic Sci.*, **1995**, *40*, 254–262.

SAMPLE

Matrix: blood, gastric contents, tissue, urine

Sample preparation: 1 mL Blood, urine, or gastric contents or 1 g tissue homogenate + 500 μL buffer + 8 mL n-hexane:ethyl acetate 70:30, mix on a rotary mixer for 10 min, centrifuge at 3000 g for 8 min. Remove the organic layer and evaporate it to dryness under a stream of nitrogen, reconstitute the residue in 100 μL 12.5 mM NaOH in MeOH:water 50:50, inject a 50 μL aliquot. (Buffer was 13.8 g potassium carbonate in 100 mL water, pH adjusted to 9.5 with concentrated HCl.)

HPLC VARIABLES

Guard column: 4 × 4 30 μm LiChrocart Aluspher RP-select B (Merck)

Column: 125 × 4 5 μm Aluspher RP-select B (Merck)

Mobile phase: Gradient. A was 12.5 mM NaOH in MeOH. B was 12.5 mM NaOH in water. A:B 10:90 for 5 min, to 90:10 over 15 min, maintain at 90:10 for 5 min, return to initial conditions over 1 min, re-equilibrate for 5 min.

Flow rate: 1

Injection volume: 50

Detector: UV 230, 254

CHROMATOGRAM

Retention time: 17

OTHER SUBSTANCES

Extracted: alprenolol, amitriptyline, bromazepam, carbamazepine, chlordiazepoxide, chlorpromazine, clonazepam, desipramine, diazepam, flunitrazepam, haloperidol, nordiazepam, nortriptyline, pindolol, zolpidem

Also analyzed: acebutolol, acetaminophen, alprazolam, amphetamine, atenolol, betaxolol, brotizolam, caffeine, camazepam, captopril, chloroquine, clobazam, clomipramine, clothiapine, clotiazepam, cloxazolam, cocaine, codeine, diclofenac, dihydralazine, dihydrocodeine, dihydroergotamine, diphenhydramine, domperidone, doxepin, droperidol, ergotamine, ethyl loflazepate, fenethylline, fluoxetine, flupentixol, flurazepam, furosemide, gliclazide, hydrochlorothiazide,

hydroxyzine, ibuprofen, imipramine, ketazolam, loprazolam, lorazepam, lormetazepam, maprotiline, medazepam, mepyramine, methadone, methaqualone, methyldopa, methylphenidate, metoclopramide, metoprolol, mexiletine, mianserin, midazolam, minoxidil, morphine, nadolol, nitrazepam, oxprenolol, papaverine, pentazocine, phenprocoumon, phenylbutazone, pipamperone, piritramide, practolol, prazepam, prazosin, promazine, promethazine, propoxyphene, propranolol, prothipendyl, quinine, sotalol, sulpride, thioridazine, trazodone, triazolam, trimipramine, tripelennamine, tyramine, verapamil, yohimbine

REFERENCE

Lambert,W.E.; Meyer,E.; De Leenheer,A.P. Systematic toxicological analysis of basic drugs by gradient elution of an alumina-based HPLC packing material under alkaline conditions, *J.Anal.Toxicol.*, **1995**, *19*, 73–78.

SAMPLE

Matrix: blood, urine

Sample preparation: Add 1 mL whole blood or urine to Toxi-Tube A (Toxi-Lab, Irvine CA), add 3 mL water, mix by gentle inversion for 5 min, centrifuge at 1500 g for 5 min. Remove the organic layer and evaporate it to dryness under a stream of nitrogen at 40°, reconstitute the residue with 50 μL MeCN:water 50:50, vortex for 10 s, centrifuge at 7500 g for 2 min, inject a 10 (urine) or 30 (blood) μL aliquot. (The detector wavelength shown is the wavelength of maximum absorbance. This will not necessarily be the optimal wavelength for the separation. Multiple wavelengths from 200-350 nm can be scanned using a diode-array detector. Otherwise, 220 nm may be a reasonable choice for initial work. Matrix may interfere.)

HPLC VARIABLES

Guard column: 20 mm long Symmetry C18

Column: 250 × 4.6 5 μm Symmetry C8 (Waters)

Mobile phase: Gradient. A was 50 mM pH 3.8 sodium phosphate buffer. B was MeCN. A:B 85:15 for 6.5 min, 65:35 for 18.5 min, 20:80 for 3 min (step gradient), re-equilibrate at initial conditions for 7 min.

Column temperature: 30

Flow rate: 1 for 6.5 min, to 1.5 over 18.5 min, maintain at 1.5 for 3 min (re-equilibrate at 1.5 mL/min)

Injection volume: 10-30

Detector: UV 236.9

CHROMATOGRAM

Retention time: 22.087

KEY WORDS

whole blood

REFERENCE

Gaillard,Y.; Pépin,G. Use of high-performance liquid chromatography with photodiode-array UV detection for the creation of a 600-compound library. Application to forensic toxicology, *J.Chromatogr.A*, **1997**, *763*, 149–163.

SAMPLE

Matrix: cytosol incubations

Sample preparation: 2 mL Incubation + 5 mL chlorobutane:1,2-dichloroethane 80:20, shake for 15 min, centrifuge at 4000 g for 10 min. Remove the upper organic layer and evaporate it to dryness under a stream of nitrogen at 50°, reconstitute the residue in 400 μL mobile phase, inject an 80 μL aliquot.

HPLC VARIABLES

Column: 300 × 3.9 μBondapak C18

Mobile phase: MeOH:10 mM ammonium phosphate buffer 66:34, pH 5.8

Flow rate: 1.5

Injection volume: 80

Detector: UV 230

OTHER SUBSTANCES

Extracted: diphenyl sulfoxide

KEY WORDS
rat; rabbit; nitrendipine is IS

REFERENCE
Lee,S.C.; Renwick,A.G. Sulphoxide reduction by rat and rabbit tissues *in vitro*, *Biochem.Pharmacol.*, **1995**, *49*, 1557–1565.

SAMPLE
Matrix: microsomal incubations
Sample preparation: Condition a 100 mg Bond Elut C18 SPE cartridge with 2 mL MeOH and 1 mL 1% aqueous formic acid. Add the microsomal incubation to the SPE cartridge, wash with 1 mL 1% aqueous formic acid, elute with 1 mL MeCN. Evaporate the eluate to dryness under a stream of nitrogen in the dark at room temperature, reconstitute the residue in 1 mL MeCN: 0.5% phosphoric acid 10:90, inject a 50 μL aliquot.

HPLC VARIABLES
Column: 250 × 4 10 μm Nucleosil RP C8
Mobile phase: Gradient. MeCN:0.5% phosphoric acid from 40:60 to 60:40 over 12 min.
Flow rate: 1.4
Injection volume: 50
Detector: UV 234, UV 345

CHROMATOGRAM
Retention time: 8

OTHER SUBSTANCES
Extracted: metabolites

KEY WORDS
rat; liver; SPE

REFERENCE
Böcker,R.H.; Preuss,E.; Peter,R. High-performance liquid chromatography of the metabolites of nitrendipine and investigation into the metabolic pathways of this dihydropyridine, *J.Chromatogr.*, **1990**, *530*, 206–211.

SAMPLE
Matrix: microsomal incubations, perfusate
Sample preparation: Extract using a 100 mg 1 mL Bond Elut C2 SPE cartridge, elute with MeOH, evaporate eluate to dryness under a stream of nitrogen, reconstitute the residue in 100 μL mobile phase, inject an aliquot.

HPLC VARIABLES
Column: 250 × 5 Hichrom HiRPB deactivated reverse-phase
Mobile phase: MeOH:25 mM pH 5.0 N,N,N',N'-tetramethylethylenediamine phosphate buffer 75:25
Flow rate: 1
Detector: UV 245

CHROMATOGRAM
Internal standard: felodipine
Limit of detection: 5 ng/mL

KEY WORDS
rat; liver; SPE

REFERENCE
Walker,D.K.; Humphrey,M.J.; Smith,D.A. Importance of metabolic stability and hepatic distribution to the pharmacokinetic profile of amlodipine, *Xenobiotica*, **1994**, *24*, 243–250.

SAMPLE
Matrix: perfusate

HPLC VARIABLES
Column: 100 × 8 5 μm Novapak C18 radial compression
Mobile phase: MeCN:10 mM pH 4.5 phosphate buffer 70:30
Flow rate: 2
Detector: UV 237

OTHER SUBSTANCES
Also analyzed: felodipine, nicardipine, nifedipine, nimodipine

REFERENCE
Diez,I.; Colom,H.; Moreno,J.; Obach,R.; Peraire,C.; Domenech,J. A comparative in vitro study of transdermal absorption of a series of calcium channel antagonists, *J.Pharm.Sci.*, **1991**, *80*, 931–934.

SAMPLE
Matrix: solutions
Sample preparation: Prepare a solution in mobile phase, inject a 20 μL aliquot.

HPLC VARIABLES
Guard column: present but not specified
Column: 75 × 4.6 3 μm XL octyl (Beckman)
Mobile phase: MeCN:water 44:56 containing 5 mM heptanesulfonic acid
Flow rate: 1
Injection volume: 20
Detector: UV 254

CHROMATOGRAM
Retention time: 6.2

REFERENCE
Greiner,P.O.; Angignard,D.; Cahn,J. High performance liquid chromatography of a new 1,4-dihydropyridine: applications to pharmacokinetic study in dogs, *J.Pharm.Sci.*, **1988**, *77*, 387–389.

SAMPLE
Matrix: solutions
Sample preparation: Inject a 10 μL aliquot of a solution in MeCN.

HPLC VARIABLES
Column: 100 × 4.6 CS-MP Spheri-5 cyano
Mobile phase: Gradient. MeCN:buffer from 10:90 to 40:60 over 10 min, re-equilibrate for 5 min. (Buffer was 50 mM KH_2PO_4 adjusted to pH 3 with phosphoric acid.)
Flow rate: 1.5
Injection volume: 10
Detector: UV 200, 272, 276, 280, 314

CHROMATOGRAM
Retention time: 11

OTHER SUBSTANCES
Simultaneous: nifedipine

REFERENCE
Logan,B.K.; Patrick,K.S. Photodegradation of nifedipine relative to nitrendipine evaluated by liquid and gas chromatography, *J.Chromatogr.*, **1990**, *529*, 175–181.

SAMPLE
Matrix: solutions

Sample preparation: Centrifuge at 2000 g at 37° for 15 min.

HPLC VARIABLES
Column: 100 × 8 5 μm C18 Novapak
Mobile phase: MeCN:10 mM pH 4.5 phosphate buffer 70:30
Flow rate: 2
Detector: UV 237

OTHER SUBSTANCES
Also analyzed: nicardipine, nifedipine, nimodipine, felodipine

KEY WORDS
buffers

REFERENCE
Diez,I.; Colom,H.; Moreno,J.; Obach,R.; Peraire,C.; Domenech,J. A comparative in vitro study of transdermal absorption of a series of calcium channel antagonists, *J.Pharm.Sci.*, **1991**, *80*, 931–934.

SAMPLE
Matrix: solutions
Sample preparation: Prepare a solution in mobile phase, inject an aliquot.

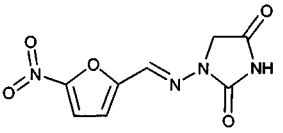
HPLC VARIABLES
Column: 250 × 4.6 Nucleosil 5C18
Mobile phase: MeCN:water 60:40 containing 5.25 mL/L 1% phosphoric acid, 2.5 g/L ammonium phosphate, and 10 mL/L 10% tetra-n-butylammonium hydroxide
Detector: UV 254

OTHER SUBSTANCES
Simultaneous: nilvadipine

KEY WORDS
protect from light

REFERENCE
Kobayashi,D.; Matsuzawa,T.; Sugibayashi,K.; Morimoto,Y.; Kobayashi,M.; Kimura,M. Feasibility of use of several cardiovascular agents in transdermal therapeutic systems with *l*-menthol-ethanol system on hairless rat and human skin, *Biol.Pharm.Bull.*, **1993**, *16*, 254–258.

Nitrofurantoin



Molecular formula: $C_8H_6N_4O_6$
Molecular weight: 238.16
CAS Registry No.: 67-20-9
Merck Index: 6696
Lednicer No.: 1 230

SAMPLE
Matrix: cell cultures
Sample preparation: Centrifuge cell culture at 4000 g for 30 min, filter (0.2 μm Acrodisk), inject an aliquot.

HPLC VARIABLES
Column: 250 × 4.6 5 μm Prodigy ODS-3
Mobile phase: Gradient. A was MeCN containing 2 g/L ammonium acetate. B was water. A:B 5:95 for 2 min, to 80:20 over 30 min, 80:20 for 5 min

Flow rate: 1
Injection volume: 20
Detector: UV 376

CHROMATOGRAM
Retention time: 24.5

REFERENCE
Rafii,F.; Hansen,E.B.,Jr. Isolation of nitrofurantoin-resistant mutants of nitroreductase-producing Clostridium sp. Strains from the human intestinal tract, *Antimicrob.Agents Chemother.*, **1998**, *42*, 1121–1126.

SAMPLE
Matrix: milk
Sample preparation: Mix 50 mL cow milk with 25 mL 20% trichloroacetic acid, let stand for 15 min. Filter the samples and wash with water. Adjust the pH to 4.5-5 with NaOH, make up to 100 mL with water. Take a 25 mL aliquot and add it to a Sep-Pak Plus C18 SPE cartridge, elute with 2.5 mL mobile phase, pass nitrogen through eluate for at least 2 min (to remove oxygen), inject an aliquot.

HPLC VARIABLES
Guard column: Symmetry C18
Column: 150 × 3.9 4 μm Nova Pak C18
Mobile phase: MeCN:100mM aqueous sodium perchlorate:glacial acetic acid 28:72:0.5
Flow rate: 1
Injection volume: 20
Detector: E, ESA Coulochem II, Model 5011 analytical cell, porous carbon electrode -600 V, Model 5021 conditioning cell

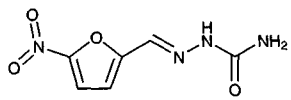
CHROMATOGRAM
Retention time: 2.2
Limit of detection: 4 ppb

OTHER SUBSTANCES
Extracted: furaltadone, furazolidone

KEY WORDS
cow; SPE

REFERENCE
Galeano Diaz,T.; Guiberteau Cabanillas,A.; Acedo Valenzuela,M.I.; Correa,C.A.; Salinas,F. Determination of nitrofurantoin, furazolidone and furaltadone in milk by high-performance liquid chromatography with electrochemical detection, *J.Chromatogr.A*, **1997**, *764*, 243–248.

Nitrofurazone



Molecular formula: $C_6H_6N_4O_4$
Molecular weight: 198.14
CAS Registry No.: 59-87-0
Merck Index: 6697
Lednicer No.: 1 229

SAMPLE
Matrix: blood, urine
Sample preparation: Add 1 mL whole blood or urine to Toxi-Tube A (Toxi-Lab, Irvine CA), add 3 mL water, mix by gentle inversion for 5 min, centrifuge at 1500 g for 5 min. Remove the organic layer and evaporate it to dryness under a stream of nitrogen at 40°, reconstitute the residue with 50 μL MeCN:water 50:50, vortex for 10 s, centrifuge at 7500 g for 2 min, inject

a 10 (urine) or 30 (blood) μL aliquot. (The detector wavelength shown is the wavelength of maximum absorbance. This will not necessarily be the optimal wavelength for the separation. Multiple wavelengths from 200-350 nm can be scanned using a diode-array detector. Otherwise, 220 nm may be a reasonable choice for initial work. Matrix may interfere.)

HPLC VARIABLES
Guard column: 20 mm long Symmetry C18
Column: 250 × 4.6 5 μm Symmetry C8 (Waters)
Mobile phase: Gradient. A was 50 mM pH 3.8 sodium phosphate buffer. B was MeCN. A:B 85:15 for 6.5 min, 65:35 for 18.5 min, 20:80 for 3 min (step gradient), re-equilibrate at initial conditions for 7 min.
Column temperature: 30
Flow rate: 1 for 6.5 min, to 1.5 over 18.5 min, maintain at 1.5 for 3 min (re-equilibrate at 1.5 mL/min)
Injection volume: 10-30
Detector: UV 260.6

CHROMATOGRAM
Retention time: 10.323

KEY WORDS
whole blood

REFERENCE
Gaillard,Y.; Pépin,G. Use of high-performance liquid chromatography with photodiode-array UV detection for the creation of a 600-compound library. Application to forensic toxicology, *J.Chromatogr.A*, **1997**, *763*, 149–163.

SAMPLE
Matrix: eggs, tissue
Sample preparation: Add 30 mL MeCN to 10 g homogenized shelled eggs, liver, or muscle, blend at low speed for 2 min, centrifuge at 1000 g for 5 min, add 10 mL 10% NaCl solution and 50 mL dichloromethane to the supernatant, shake for a few min. Filter the lower organic layer through 5 g anhydrous sodium sulfate, evaporate the filtrate to dryness using a rotary vacuum evaporator at 45°, redissolve the residue in 1 mL MeCN:MeOH:20 mM pH 4.6 sodium acetate 10:50:40, inject an aliquot. (Protect from light. Wash the 1 mL of MeCN:MeOH:20 mM pH 4.6 sodium acetate 10:50:40 three times with 1 mL n-hexane before use.)

HPLC VARIABLES
Column: 250 × 4.6 5 μm Supelcosil L C18-DB
Mobile phase: MeCN:water 50:50 containing 1 mM ammonium acetate and 0.025% acetic acid
Flow rate: 0.6
Injection volume: 20
Detector: MS, PESCIEX API I, ionspray interface 5500 V, OR 60 V, m/z 199, split the column effluent so that 0.03 mL/min enters the MS

CHROMATOGRAM
Retention time: 5.2
Limit of detection: 3.2 ng/g

KEY WORDS
chicken; liver; muscle

REFERENCE
Draisci,R.; Giannetti,L.; Lucentini,L.; Palleschi,L.; Brambilla,G.; Serpe,L.; Gallo,P. Determination of nitrofuran residues in avian eggs by liquid chromatography-UV photodiode array detection and confirmation by liquid chromatography-ionspray mass spectrometry, *J.Chromatogr.A*, **1997**, *777*, 201–211.

SAMPLE
Matrix: eggs, tissue

Sample preparation: Add 30 mL MeCN to 10 g homogenized shelled eggs, liver, or muscle, blend at low speed for 2 min, centrifuge at 1000 g for 5 min, add 10 mL 10% NaCl solution and 50 mL dichloromethane to the supernatant, shake for a few min. Filter the lower organic layer through 5 g anhydrous sodium sulfate, evaporate the filtrate to dryness using a rotary vacuum evaporator at 45°, redissolve the residue in 1 mL MeCN:MeOH:20 mM pH 4.6 sodium acetate 10:50:40, inject an aliquot. (Protect from light. Wash the 1 mL of MeCN:MeOH:20 mM pH 4.6 sodium acetate 10:50:40 three times with 1 mL n-hexane before use.)

HPLC VARIABLES

Guard column: 10 × 4.6 μBondapak C18
Column: 150 × 4.6 5 μm Spherisorb ODS2 S5
Mobile phase: MeCN:20 mM pH 4.6 sodium acetate 21:79
Flow rate: 1
Injection volume: 50
Detector: UV 362

CHROMATOGRAM

Retention time: 5.3
Limit of detection: 2.5 ng/g

OTHER SUBSTANCES

Extracted: furazolidone, furaltadone

KEY WORDS

chicken; liver; muscle

REFERENCE

Draisci,R.; Giannetti,L.; Lucentini,L.; Palleschi,L.; Brambilla,G.; Serpe,L.; Gallo,P. Determination of nitrofuran residues in avian eggs by liquid chromatography-UV photodiode array detection and confirmation by liquid chromatography-ionspray mass spectrometry, *J.Chromatogr.A*, **1997**, *777*, 201–211.

SAMPLE

Matrix: eggs, tissue
Sample preparation: Blend (Stomacher) 10 g homogenized tissue with 30 mL saline for 3 min, centrifuge at 2000 g, mix 20 mL of the supernatant with 2 mL 1% sodium azide. Dilute 10 mL homogenized egg with 10 mL saline, add 3 mL 10% sodium azide solution. Dialyze sample using a Cuprophan membrane (10000-15000 dalton cut-off) against water pumped at 0.36-1.44 mL/min for 3-9 min, pass the water through column A, flush the column with pure water for 8 min, backflush the contents of column A onto column B with mobile phase, after 5 min remove column A from the circuit, elute column B with mobile phase, monitor the effluent from column B. To increase sensitivity a number of sample batches can be dialyzed before the contents of column A are analyzed. (Caution! Sodium azide is carcinogenic, mutagenic, and highly toxic! Do not discharge to the sink!)

HPLC VARIABLES

Column: A 60 × 4.6 37-50 μm Bondapak C18/Corasil; B 250 × 4.6 5 μm Hypersil ODS
Mobile phase: MeCN:100 mM pH 5 acetate buffer 20:80
Flow rate: 1
Detector: UV 365

CHROMATOGRAM

Retention time: 6
Limit of detection: 2 ng/g (tissue), 1 ng/g (eggs)

OTHER SUBSTANCES

Extracted: furaltadone, furazolidone, nitrofurantoin

KEY WORDS

protect from light; cow; muscle; dialysis; column-switching

REFERENCE
Aerts,M.M.; Beek,W.M.; Brinkman,U.A. On-line combination of dialysis and column-switching liquid chromatography as a fully automated sample preparation technique for biological samples. Determination of nitrofuran residues in edible products, *J.Chromatogr.*, **1990**, *500*, 453–468.

SAMPLE
Matrix: feed
Sample preparation: Grind feed to pass 20 mesh. 10 g Feed + 5 mL water, swirl, let stand for 5 min, add 50 mL DMF:water 95:5, shake vigorously for 15 s, let stand in the dark at room temperature overnight, filter (paper). Add 15 mL of the filtrate to 5 g alumina (Alcoa F-20, 80-200 mesh) in a 300 × 10 glass column, discard first several mL of eluate, collect remaining eluate, inject an aliquot

HPLC VARIABLES
Guard column: 100 × 2 μBondapak C18/Corasil
Column: 300 × 4 μBondapak C18
Mobile phase: MeCN:1% acetic acid 20:80
Detector: UV 280, UV 365

CHROMATOGRAM
Retention time: 5

OTHER SUBSTANCES
Extracted: furazolidone, carbadox

KEY WORDS
protect from light

REFERENCE
Thorpe,V.A. Sample preparation of carbadox, furazolidone, nitrofurazone, and ethopabate in medicated feeds for high pressure liquid chromatography, *J.Assoc.Off.Anal.Chem.*, **1980**, *63*, 981–984.

SAMPLE
Matrix: food
Sample preparation: Condition a 6 mL Bond Elut C18 SPE cartridge with 5 mL MeOH and 5 mL water. Homogenize (Tissuemizer) 5 g finely-chopped (by hand) shrimp and 20 mL MeCN at medium speed for 45 s, centrifuge at 3000 rpm for 5 min, decant the supernatant. Add 30 mL hexane saturated with MeCN to the supernatant, shake for 30 s, discard the hexane layer. Add 10 mL EtOH to the MeCN layer, evaporate under reduced pressure at 45° to 2-5 mL (until liquid looks milky), add 2 mL EtOH, continue evaporation until there is 2 mL of a thick liquid, add 2 mL EtOH, evaporate to dryness. Add 2 mL water to the residue, sonicate for 5 min, add to the SPE cartridge, wash with 4 mL water, elute at ≤3 mL/min with 5 mL MeCN. Evaporate the eluate to dryness under a stream of nitrogen at ≤45° (remove promptly when dry), reconstitute the residue in 1 mL mobile phase, filter (0.45 μm), inject a 50 μL aliquot.

HPLC VARIABLES
Guard column: 20 × 4 5 μm ODS Hypersil C18
Column: 200 × 4.6 5 μm ODS Hypersil C18
Mobile phase: MeCN:1% aqueous acetic acid 25:75
Column temperature: 40
Flow rate: 1
Injection volume: 50
Detector: UV 375

CHROMATOGRAM
Retention time: 3.7
Limit of quantitation: 4 ng/g

OTHER SUBSTANCES
Extracted: furazolidone

KEY WORDS
SPE; shrimp

REFERENCE
Rupp,H.S.; Munns,R.K.; Long,A.R. Simultaneous determination of nitrofurazone and furazolidone in shrimp (*Penaeus vannamei*) muscle tissue by liquid chromatography with UV detection, *J.AOAC Int.*, **1993**, *76*, 1235–1239.

SAMPLE
Matrix: solutions
Sample preparation: Prepare a solution in MeOH:water 30:70, inject a 20 μL aliquot.

HPLC VARIABLES
Column: 150 × 3.9 5 μm Resolve spherical C18 (Waters)
Mobile phase: MeOH:water 35:65
Column temperature: 40
Flow rate: 1
Injection volume: 20
Detector: UV 305

CHROMATOGRAM
Retention time: 3

OTHER SUBSTANCES
Simultaneous: carbadox, furazolidone
Noninterfering: pyrantel

KEY WORDS
protect from light

REFERENCE
Roybal,J.E.; Munns,R.K.; Shimoda,W. Liquid chromatographic determination of carbadox residues in animal feed, *J.Assoc.Off.Anal.Chem.*, **1985**, *68*, 653–657.

SAMPLE
Matrix: solutions
Sample preparation: Dissolve in chloroform at a concentration of 1 μg/mL, inject an aliquot.

HPLC VARIABLES
Column: 250 × 4 5 μm Lichrospher RP-18
Mobile phase: MeCN:10 mM sodium acetate 20:80, pH 5
Column temperature: 30
Flow rate: 1.6
Injection volume: 20
Detector: UV 365

CHROMATOGRAM
Retention time: 7.5
Limit of detection: 15 ng/mL

OTHER SUBSTANCES
Simultaneous: degradation products, carbadox, nitrofurantoin, furazolidone, furaltadone

REFERENCE
Kaniou,I.; Zachariadis,G.; Kalligas,G.; Tsoukali,H.; Stratis,J. Separation and determination of carbadox, nitrofurazone, nitrofurantoin, furazolidone, and furaltadone in their mixtures by thin layer and high performance liquid chromatography, *J.Liq.Chromatogr.*, **1994**, *17*, 1385–1398.

SAMPLE
Matrix: tissue

Sample preparation: Homogenize (Waring blender) 10 g muscle, liver, or kidney in 100 mL EtOH for 5 min, let stand for 5 min, filter through 10 g Celite 545 on top of a sintered glass filter, rinse blender with 100 mL EtOH and filter rinse. Add 25 mL 3.6% aqueous metaphosphoric acid to the combined filtrates, evaporate to 25 mL under reduced pressure at 45°. Remove residue, rinse out flask with 5 mL hexane and 3 mL water, combine, centrifuge at 0° at 27000 g for 30 min, discard hexane, rinse surface with 5 mL hexane, discard hexane. Remove aqueous layer, rinse out tube twice with 3 mL portions of water, combine, add 10 mL 1 M KH_2PO_4, make up to 100 mL with water, extract three times for 5 min with 50 mL ethyl acetate. Combine the extracts and dry them over 15 g anhydrous sodium sulfate, filter through glass wool, evaporate to dryness under reduced pressure at 45°. Take up residue in 3 mL ethyl acetate and add to alumina column, rinse flask with 2 mL ethyl acetate and add rinse to column. Elute with 20 mL EtOH:MeOH:ethyl acetate 10:10:80 and combine all the eluate. Evaporate to dryness under reduced pressure at 45°, reconstitute in 500 μL mobile phase, inject a 100 μL aliquot. (Prepare alumina column by slurrying 1 g aluminum oxide (Baker) in 20 mL ethyl acetate and adding to a 200 × 6 glass chromatographic column.)

HPLC VARIABLES

Guard column: Brownlee 10 μm RP-GU MPLC C-8
Column: 250 × 4.6 Brownlee RP-10A C-8
Mobile phase: MeCN:EtOH:10 mM ammonium acetate 25:5:70, pH 6.8
Flow rate: 1
Injection volume: 100
Detector: UV 350

CHROMATOGRAM

Retention time: 6.6
Limit of detection: 2 ng
Limit of quantitation: 10 ng

OTHER SUBSTANCES

Extracted: quinoxaline-2-carboxylic acid, furazolidone, carbadox, desoxycarbadox

KEY WORDS

protect from light; pig; muscle; liver; kidney

REFERENCE

MacIntosh,A.I.; Neville,G.A. Liquid chromatographic determination of carbadox, desoxycarbadox, and nitrofurazones in pork tissues, *J.Assoc.Off.Anal.Chem.*, **1984**, *67*, 958–962.

SAMPLE

Matrix: tissue
Sample preparation: Homogenize (Ultra-Turrax TP 18/2) 3 g ground muscle + 6.8 mL MeCN for 6 s, centrifuge at 5000 rpm for 5 min. Remove 6.5 mL of the supernatant and add it to 2 mL 5 M NaCl, shake vigorously for 10 s, centrifuge at 3000 rpm for 2 min. Remove the organic layer and evaporate it to dryness under a stream of nitrogen at 43°, reconstitute the residue in 250 μL MeCN:buffer 20:80, add 1 mL hexane, mix (Whirlimixer), centrifuge for 4 min, discard the hexane layer, filter (Costar Spin-X 0.22 μm cellulose acetate) while centrifuging at 5600 g for 4 min, inject a 20 μL aliquot of the filtrate. (Buffer was 20 mM sodium 1-heptanesulfonate and 10 mM Na_2HPO_4, pH adjusted to 6.0 with phosphoric acid.)

HPLC VARIABLES

Guard column: 20 × 4.6 5 μm Supelcosil LC-ABZ
Column: 250 × 4.6 5 μm Supelcosil LC-ABZ
Mobile phase: MeCN:buffer 25:75 (Buffer was 4.45 g sodium 1-heptanesulfonate and 9.5 g $Na_3PO_4.12H_2O$ in 750 mL water, adjust pH to 2.5 with 5 M phosphoric acid, make up to 1 L with water.)
Flow rate: 1
Injection volume: 20
Detector: UV 365

CHROMATOGRAM

Retention time: 5.5

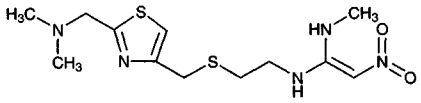
Internal standard: nitrofurazone

OTHER SUBSTANCES
Extracted: furazolidone

KEY WORDS
cow; muscle; nitrofurazone is IS

REFERENCE
Hormazábal,V.; Yndestad,M. Simple and rapid method of analysis for furazolidone in meat tissues by high-performance liquid chromatography, *J.Liq.Chromatogr.*, **1995**, *18*, 1871–1877.

Nizatidine



Molecular formula: $C_{12}H_{21}N_5O_2S_2$
Molecular weight: 331.46
CAS Registry No.: 76963-41-2
Merck Index: 6758
Lednicer No.: 4 95

SAMPLE
Matrix: blood, tissue
Sample preparation: Plasma. 100 μL Plasma + 100 μL 75 μM IS + 100 μL 5 M NaOH + 5 mL dichloromethane, shake for 10 min, centrifuge at 2000 rpm for 10 min. Evaporate 4 mL of the organic phase to dryness under a stream of nitrogen. Dissolve residue in 100 μL mobile phase, inject a 50 μL aliquot. Tissue. Homogenize 500 mg liver with saline on ice for 1 min. Add 100 μL 75 μM IS, 100 μL 0.5 M NaOH, and 5 mL dichloromethane, shake for 10 min, centrifuge at 3000 rpm for 10 min. Evaporate 3 mL of the organic phase to dryness under a stream of nitrogen. Dissolve residue in 100 μL mobile phase, pass through a Ministar-RC 15 cartridge (Sartorius, Germany), inject a 50 μL aliquot.

HPLC VARIABLES
Guard column: 30 × 4.6 Senshu Pak ODS-1031 (Senshu Sciences, Japan)
Column: 250 × 4.6 Senshu Pak ODS -1251 (Senshu Sciences, Japan)
Mobile phase: MeCN:water 5:95 containing 5 mM NaH_2PO_4 and 5 mM tetramethylammonium chloride
Flow rate: 1.5
Injection volume: 50
Detector: UV 228

CHROMATOGRAM
Internal standard: cimetidine
Limit of detection: 50-100 μg/mL (sic)

KEY WORDS
plasma; rat; pharmacokinetics

REFERENCE
Takedomi,S.; Matsuo,H.; Yamano,K.; Yamamoto,K.; Iga,T.; Sawada,Y. Quantitative prediction of the interaction of midazolam and histamine H_2 receptor antagonists in rats, *Drug Metab.Dispos.*, **1998**, *26*, 318–323.

SAMPLE
Matrix: blood, urine
Sample preparation: Add 1 mL whole blood or urine to Toxi-Tube A (Toxi-Lab, Irvine CA), add 3 mL water, mix by gentle inversion for 5 min, centrifuge at 1500 g for 5 min. Remove the organic layer and evaporate it to dryness under a stream of nitrogen at 40°, reconstitute the residue with 50 μL MeCN:water 50:50, vortex for 10 s, centrifuge at 7500 g for 2 min, inject

a 10 (urine) or 30 (blood) μL aliquot. (The detector wavelength shown is the wavelength of maximum absorbance. This will not necessarily be the optimal wavelength for the separation. Multiple wavelengths from 200-350 nm can be scanned using a diode-array detector. Otherwise, 220 nm may be a reasonable choice for initial work. Matrix may interfere.)

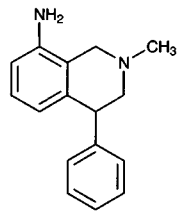
HPLC VARIABLES
Guard column: 20 mm long Symmetry C18
Column: 250 × 4.6 5 μm Symmetry C8 (Waters)
Mobile phase: Gradient. A was 50 mM pH 3.8 sodium phosphate buffer. B was MeCN. A:B 85:15 for 6.5 min, 65:35 for 18.5 min, 20:80 for 3 min (step gradient), re-equilibrate at initial conditions for 7 min.
Column temperature: 30
Flow rate: 1 for 6.5 min, to 1.5 over 18.5 min, maintain at 1.5 for 3 min (re-equilibrate at 1.5 mL/min)
Injection volume: 10-30
Detector: UV 316.4

CHROMATOGRAM
Retention time: 3.302

KEY WORDS
whole blood

REFERENCE
Gaillard,Y.; Pépin,G. Use of high-performance liquid chromatography with photodiode-array UV detection for the creation of a 600-compound library. Application to forensic toxicology, *J.Chromatogr.A*, **1997**, *763*, 149–163.

Nomifensine



Molecular formula: $C_{16}H_{18}N_2$
Molecular weight: 238.33
CAS Registry No.: 24526-64-5, 32795-47-4 (maleate)
Merck Index: 6768
Lednicer No.: 4 146

SAMPLE
Matrix: blood
Sample preparation: 2 mL Whole blood or plasma + 2 mL buffer + 5 mL chloroform:isopropanol:n-heptane 60:14:26, shake gently horizontally for 10 min, centrifuge at 2800 g for 10 min. Remove the lower organic layer and evaporate it to dryness under vacuum at 45°, reconstitute the residue in 100 μL mobile phase, centrifuge at 2800 g for 5 min, inject a 50 μL aliquot of the supernatant. (Buffer was saturated ammonium chloride solution 25% diluted with water, adjusted to pH 9.5 with 25% ammonia solution.)

HPLC VARIABLES
Column: 300 × 3.9 4 μm NovaPack C18
Mobile phase: MeOH:THF:buffer 65:5:30 (Buffer was 0.68 g/L (10 mM (sic)) KH_2PO_4 adjusted to pH 2.6 with concentrated orthophosphoric acid.) (At the end of each session wash the column with water for 1 h and MeOH for 1 h, re-equilibrate for 30 min.)
Column temperature: 30
Flow rate: 0.8
Injection volume: 50
Detector: UV 240

CHROMATOGRAM
Retention time: 4.87
Limit of detection: <120 ng/mL

KEY WORDS

whole blood; plasma; interferences may occur–compounds (all of which are extracted) elute in this order tenoxicam; iproniazid; methocarbamol; methotrexate; caffeine; nialamide; colchicine; cytarabine; benzoylecgonine; acetaminophen; diazoxide; dacarbazine; sulfinpyrazole; flumazenil; sulpride; morphine; atenolol; toloxatone; terbutaline; albuterol; phenobarbital; ranitidine; tiapride; phenol; chlormezanone; aspirin; metformin; ritodrine; codeine; sultopride; amisulpride; naltrexone; lisinopril; benzocaine; nizatidine; nalorphine; mephenesin; naloxone; sotalol; carteolol; procainamide; carbamazepine; bromazepam; nalbuphine; nadolol; procarbazine; dihydralazine; omeprazole; strychnine; acebutolol; glutethimide; chlorpropamide; glipizide; triazolam; prazosin; flunitrazepam; clonazepam; metoclopramide; melphalan; estazolam; tolbutamide; ephedrine; clonidine; pindolol; clobazam; minoxidil; disopyramide; nitrazepam; dextromethorphan; tofisopam; zopiclone; debrisoquine; sulindac; alprazolam; cycloguanil; lorazepam; methaqualone; ketamine; piroxicam; metoprolol; nifedipine; quinine; mephentermine; prilocaine; pentazocine; oxazepam; tiaprofenic acid; quinidine; celiprolol; ajmaline; yohimbine; lidocaine; secobarbital; viloxazine; mepivacaine; meperidine; doxylamine; labetalol; temazepam; amodiaquine; benperidol; droperidol; hydroxychloroquine; zolpidem; ketoprofen; alminoprofen; cicletanine; moclobemide; chloroquine; cocaine; timolol; nomifensine; ticlopidine; acenocoumarol; vindesine; mexiletine; dipyridamole; trazodone; pipamperone; pyrimethamine; benazepril; vincristine; metapramine; chlordiazepoxide; oxprenolol; warfarin; clorazepate; flecainide; phencyclidine; thiopental; fenfluramine; metipranolol; triprolidine; naproxen; buprenorphine; verapamil; buspirone; tianeptine; midazolam; bupivacaine; carbinoxamine; loprazolam; cetirizine; chlorpheniramine; moperone; cibenzoline; medifoxamine; astemizole; vinblastine; nicardipine; bisoprolol; diltiazem; glibornuride; reserpine; aconitine; nitrendipine; diazepam; mianserin; ramipril; haloperidol; tetracaine; alprenolol; acepromethazine; glibenclamide; chlorophenacinone; doxepin; nimodipine; diphenhydramine; cyclizine; histapyrrodine; phenylbutazone; demexiptiline; clozapine; proguanil; trifluperidol; medazepam; cyamemazine; bumadizone; suriclone; propranolol; acepromazine; dothiepin; dextromoramide; fenoprofen; dextropropoxyphene; loxapine; betaxolol; propafenone; promethazine; thioproperazine; methadone; amoxapine; quinupramine; opipramol; cyproheptadine; brompheniramine; mefenidramine; protriptyline; flurbiprofen; tetrazepam; zorubicin; prazepam; alimemazine; loperamide; imipramine; desipramine; levomepromazine; hydroxyzine; niflumic acid; penbutolol; fluvoxamine; pimozide; daunorubicin; indomethacin; maprotiline; tropatenine; etodolac; fluoxetine; amitriptyline; nortriptyline; tioclomarol; diclofenac; mefloquine; trimipramine; chlorambucil; lidoflazine; ibuprofen; floctafenine; alpidem; loratadine; chlorpromazine; clomipramine; carpipramine; thioridazine; fentiazac; clemastine; mefenamic acid; fluphenazine; prochlorperazine; penfluridol; bepridil; terfenadine; trifluoperazine

REFERENCE

Tracqui,A.; Kintz,P.; Mangin,P. Systematic toxicological analysis using HPLC/DAD, *J.Forensic Sci.*, **1995**, *40*, 254–262.

SAMPLE

Matrix: bulk

Sample preparation: Mix 8 mg nomifensine maleate with 200 μL trifluoroacetic anhydride, stir at room temperature for 10 min, evaporate to dryness under a stream of nitrogen at 40°, reconstitute the residue in 2 mL mobile phase, inject a 5 μL aliquot.

HPLC VARIABLES

Column: 250 × 3.6 5 μm Spherisorb silica

Mobile phase: Chloroform:MeOH:water 100:3:0.15 containing 2 mM (+)-camphor-10-sulfonic acid

Flow rate: 1

Injection volume: 5

Detector: UV 254

CHROMATOGRAM

Retention time: 16 (D), 18 (L)

Limit of quantitation: 25 ng

KEY WORDS

derivatization; chiral; normal phase

REFERENCE

Tsujiyama,T.; Tsuchiya,M.; Hamachi,Y.; Kuriki,T.; Fukunaga,T.; Suzuki,N. Ion-pair chromatographic separation of nomifensine maleate enantiomers, *Anal.Sci.*, **1989**, *5*, 285–288.

SAMPLE

Matrix: solutions
Sample preparation: Prepare a 10 μg/mL solution in MeOH, inject a 20 μL aliquot.

HPLC VARIABLES

Column: 125 × 4.9 Spherisorb S5W silica
Mobile phase: MeOH containing 10 mM ammonium perchlorate and 1 mL/L 100 mM NaOH in MeOH, pH 6.7
Flow rate: 2
Injection volume: 20
Detector: E, LeCarbone, V25 glassy carbon electrode, + 1.2 V

CHROMATOGRAM

Retention time: 1.7

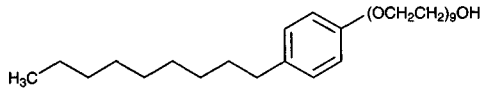
OTHER SUBSTANCES

Also analyzed: acebutolol, acepromazine, acetophenazine, N-acetylprocainamide, albuterol, alprenolol, amethocaine, amiodarone, amitriptyline, antazoline, atenolol, azacyclonal, bamethan, benactyzine, benperidol, benzethidine, benzocaine, benzoctamine, benzphetamine, benzquinamide, bromhexine, bromodiphenhydramine, bromperidol, brompheniramine, brompromazine, buclizine, bufotenine, bupivacaine, buprenorphine, butacaine, butethamate, chlorcyclizine, chlorpheniramine, chlorphenoxamine, chlorprenaline, chlorpromazine, chlorprothixene, cimetidine, cinchonidine, cinnarizine, clemastine, clomipramine, clonidine, cocaine, cyclazocine, cyclizine, cyclopentamine, cyproheptadine, deserpidine, desipramine, dextromoramide, dextropropoxyphene, dicyclomine, diethylcarbamazine, diethylpropion, diethylthiambutene, dihydroergotamine, dimethindene, dimethothiazine, diphenhydramine, diphenoxylate, dipipanone, diprenorphine, dipyridamole, disopyramide, dothiepin, doxapram, doxepin, doxylamine, droperidol, ephedrine, ergocornine, ergocristine, ergocristinine, ergocryptine, ergometrine, ergosine, ergosinine, ergotamine, ethopropazine, etorphine, etoxeridine, fenethazine, fenfluramine, fenoterol, fentanyl, flavoxate, fluopromazine, flupenthixol, fluphenazine, flurazepam, haloperidol, hydroxyzine, hyoscine, ibogaine, imipramine, indapamine, iprindole, isothipendyl, isoxsuprine, ketanserin, laudanosine, lidocaine, lofepramine, loxapine, maprotiline, mecamylamine, meclophenoxate, meclozine, medazepam, mephentermine, mepivacaine, meptazinol, mepyramine, mesoridazine, metaraminol, methadone, methamphetamine, methapyrilene, methdilazene, methotrimeprazine, methoxamine, methoxyphenamine, methoxypromazine, methylephedrine, methylergonovine, methysergide, metoclopramide, metopimazine, metoprolol, mianserin, morazone, nadolol, nalorphine, naloxone, naphazoline, nicotine, nifedipine, nortriptyline, noscapine, orphenadrine, oxeladin, oxprenolol, oxymetazolin, papaverine, pargyline, pecazine, penbutolol, pentazocine, penthienate, pericyazine, perphenazine, phenadoxone, phenampromide, phenazocine, phenbutrazate, phendimetrazine, phenelzine, phenglutarimide, phenindamine, pheniramine, phenmetrazine, phenomorphan, phenoperidine, phenothiazine, phenoxybenzamine, phentolamine, phenylephrine, phenyltoloxamine, physostigmine, piminodine, pimozide, pindolol, pipamazine, pipazethate, piperacetazine, piperidolate, pipradol, pirenzepine, piritramide, pizotifen, practolol, pramoxine, prazosin, prenylamine, prilocaine, primaquine, proadifen, procainamide, procaine, prochlorperazine, procyclidine, proheptazine, prolintane, promazine, promethazine, pronethalol, properidine, propiomazine, propranolol, prothipendyl, protriptyline, proxymetacaine, pseudoephedrine, pyrimethamine, quinidine, quinine, ranitidine, rescinnamine, sotalol, tacrine, terazosin, terbutaline, terfenadine, thenyldiamine, theophylline, thiethylperazine, thiopropazate, thioproperazine, thioridazine, thiothixene, thonzylamine, timolol, tocainide, tolpropamine, tolycaine, tranylcypromine, trazodone, trifluoperazine, trifluperidol, trimeperidine, trimeprazine, trimethobenzamide, trimethoprim, trimipramine, tripelennamine, triprolidine, tryptamine, verapamil, xylometazoline

REFERENCE

Jane,I.; McKinnon,A.; Flanagan,R.J. High-performance liquid chromatographic analysis of basic drugs on silica columns using non-aqueous ionic eluents. II. Application of UV, fluorescence and electrochemical oxidation detection, *J.Chromatogr.*, **1985**, *323*, 191–225.

Nonoxynol-9



Molecular formula: $C_{33}H_{60}O_{10}$
Molecular weight: 616.83
CAS Registry No.: 26027-38-3
Merck Index: 6772

SAMPLE

Matrix: blood, urine, vaginal fluid
Sample preparation: Urine. Centrifuge at 4000 rpm for 5 min, inject a 20 μL aliquot of the supernatant. Serum. Mix serum with an equal volume of THF, centrifuge at 4000 rpm for 5 min, remove an aliquot of the supernatant and mix it with an equal volume of THF, centrifuge at 4000 rpm for 5 min, inject a 20 μL aliquot of the supernatant. Vaginal fluid. Vortex swab with 1 mL MeCN, let stand at room temperature for 15 min, weigh, vortex, remove swab, centrifuge at 4000 rpm for 5 min, inject a 20 μL aliquot of the supernatant.

HPLC VARIABLES

Column: 250 × 4.6 10 μm R-SIL-amine (Alltech)
Mobile phase: THF:MeCN 95:5
Flow rate: 1
Injection volume: 20
Detector: F ex 275 em 575

CHROMATOGRAM

Retention time: 4
Limit of detection: 460 ng (vaginal fluid), 230 ng/mL (urine), 1.01 μg/mL (serum)

KEY WORDS

place a 2 μm filter at the column inlet

REFERENCE

Beck,G.J.; Kossak,D.; Saxena,S.J. A simple, sensitive assay for the spermicide nonoxynol-9 in biological fluids by high-performance liquid chromatography, *J.Pharm.Sci.*, **1990**, *79*, 1029–1031.

SAMPLE

Matrix: solutions
Sample preparation: Prepare a 0.2% solution, inject a 10 μL aliquot.

HPLC VARIABLES

Column: 300 × 75 PLgel 5 mixed-C (polymer Laboratories) in series with 300 × 78 Ultrastyragel 100 Å styrene-divinylbenzene(Waters)
Mobile phase: THF
Column temperature: 40
Flow rate: 1
Injection volume: 10
Detector: RI

KEY WORDS

SEC

REFERENCE

Ysambertt,F.; Cabrera,W.; Marquez,N.; Salager,J.L. Analysis of ethoxylated nonylphenol surfactants by high-performance size-exclusion chromatography (HPSEC), *J.Liq.Chromatogr.*, **1995**, *18*, 1157–1171.

SAMPLE

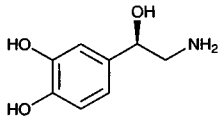
Matrix: vaginal lavage fluid
Sample preparation: 500 μL Vaginal lavage fluid (water) + 500 μL 25 μg/mL 4-octylphenol in mobile phase, vortex briefly, inject a 20 μL aliquot.

HPLC VARIABLES
Column: 250 × 4.6 10 μm R-SIL-Amine (NH2) (Alltech) (Change 2 μm filter in front of column before each run.)
Mobile phase: MeCN:THF 2:98
Flow rate: 1
Injection volume: 20
Detector: F ex 227 em 612

CHROMATOGRAM
Retention time: 5.7
Internal standard: 4-octylphenol (4.0)
Limit of detection: 480 ng/mL
Limit of quantitation: 3.125 μg/mL

REFERENCE
McPherson,J.L.; Nichols,J.H.; Barditch-Crovo,P.; Hamzeh,F.M. Determination of the spermicide nonoxynol-9 in vaginal lavage by high-performance liquid chromatography, *J.Chromatogr.B*, **1996**, *677*, 204–208.

Norepinephrine



Molecular formula: $C_8H_{11}NO_3$
Molecular weight: 169.18
CAS Registry No.: 51-41-2, 69815-49-2 (bitartrate monohydrate), 51-40-1 (bitartrate)
Merck Index: 6788

SAMPLE
Matrix: blood
Sample preparation: 20 mL Whole blood + 1 mL 20 mg/mL EDTA solution containing 10 mg/mL sodium metabisulfite, mix, centrifuge at 4° at 4000 g for 10 min. Remove the plasma and add concentrated perchloric acid until the concentration of perchloric acid is 400 mM, mix, let stand in the cold for 15 min, centrifuge at 4° at 20000 g for 20 min. Adjust pH of 2 mL supernatant to 7.0 ± 0.2 with 500 mM KOH, add 400 μL 875 μg/mL o-phthalaldehyde in pH 10.40 ± 0.02 buffer (containing 2-mercaptoethanol ?), add 2 g NaCl, add 2 mL ethyl acetate, shake for 1 min, centrifuge at 3400 g, repeat the extraction. Combine the organic layers and add them to 2 mL 35 mM pH 10.0 ± 0.1 Na_2HPO_4 buffer, shake for 1 min, centrifuge at 3400 g, discard the aqueous layer, wash the ethyl acetate layer again with phosphate buffer. Reduce the ethyl acetate volume to 100 μL under a stream of nitrogen, inject a 10-50 μL aliquot.

HPLC VARIABLES
Guard column: Co:Pell ODS
Column: 300 × 4 10 μm μBondapak phenyl
Mobile phase: Gradient. MeCN:25 mM pH 5.10 NaH_2PO_4 buffer 25:75 for 15 min then MeOH:25 mM pH 5.10 NaH_2PO_4 buffer 45:55 (step gradient).
Column temperature: 26
Flow rate: 1.5
Injection volume: 10-50
Detector: F ex 340 em 480

CHROMATOGRAM
Retention time: 11
Internal standard: tyramine (44)
Limit of detection: 0.5 ng/mL

OTHER SUBSTANCES
Extracted: dopamine, serotonin